

Amendments to Claims

1. (Currently Amended) A fuel cell stack having:
a plurality of fuel cells disposed between current-collecting end plates and
having water therein; and

at least one reactant gas manifold;

5 characterized by the improvement comprising:
each said at least one reactant gas manifold comprising either (a) a single
wall, with a VIP or GFP disposed inside or outside said single wall, or (b) a double
wall forming a chamber, said chamber containing a vacuum, a low thermal
conductivity gas, a VIP or a GDF; and

10 an insulator panel disposed on an external surface of each of said end
plates, each insulator panel comprising either (a) a hollow chamber containing a
vacuum or a low thermal conductivity gas, or (b) a VIP, or (c) a GFP.

2. (Currently Amended) A fuel cell stack according to claim 1 wherein:
said fuel cell stack has a plurality of said reactant gas manifolds and porous
water transport plates serving as reactant gas flow fields; and

5 said manifolds and said insulator panels are selected in correspondence with
the mass times heat capacity, external surface area and water inventory of said fuel
cell stack so that the water in said stack is not totally frozen when said fuel cell
stack is inoperative in an ambient environment for greater than fifty minus-degree-
days.

3. (Currently Amended) A fuel cell stack according to claim 1 wherein:
said fuel cell stack has a plurality of said reactant gas manifolds and porous
water transport plates serving as reactant gas flow fields; and

5 said manifolds and said insulator panels are selected in correspondence with
the mass times heat capacity, external surface area and water inventory of said fuel

4. (Currently Amended) A fuel cell stack according to claim 1 wherein:
said fuel cell stack has a plurality of said reactant gas manifolds and porous
~~water transport plates serving as reactant gas flow fields; and~~
said manifolds and said insulator panels ~~are selected in correspondence with~~
5 the mass times heat capacity, external surface area and water inventory of said fuel
cell stack so that the water in said stack is not totally frozen when said fuel cell
stack is inoperative in an ambient environment for about 150 minus-degree-days.

5. (Original) A fuel cell stack comprising:
a plurality of fuel cells disposed between current-collecting end plates; and
an insulator panel disposed on an external surface of each of said end
plates, each insulator panel comprising either (a) a hollow chamber containing a
5 vacuum or a low thermal conductivity gas, or (b) a VIP, or (c) a GFP.

6. (Original) A fuel cell stack according to claim 5 wherein said
insulator panels comprise either (a) a VIP or (b) a GFP with an external film of (c)
plastic or (d) resin/fiberglass composite for enhanced structural integrity.

7. (Original) An insulated reactant gas manifold for a fuel cell stack
comprising either (a) a single wall, with a VIP or GFP disposed inside or outside said
single wall, or (b) a double wall forming a chamber, said chamber containing a
vacuum, a low thermal conductivity gas, a VIP or a GDF.

8. (Original) A manifold according to claim 7 wherein said double wall
forming a chamber comprises a layer of either (c) plastic or (d) resin/fiberglass
composite on the surfaces of (e) a VIP or (f) a GFP for enhanced structural integrity.